

15-110 Recitation Week 6

Reminders

- HW3 due Monday 02/26 at Noon
- How was the exam?
- Code Reviews this weekend!
- [Feedback Form](#)

Overview

- Linear and Binary Search
- Aliasing Code Trace
- Recursive Code Tracing
- Recursive Code Writing Practice

Problems

LINEAR AND BINARY SEARCH

Binary search review notes:

```
def binarysearch(L, item):
    if len(L) == 0:
        return False
    mid = len(L)//2
    if L[mid] == item:
        return True
    elif L[mid] > item:
        return binarysearch(L[:mid], item)
    else:
        return binarysearch(L[mid+1:], item)
```

Run a visual trace on the list [2, 4, 6, 7, 10, 11] and find 1 and 7 using both linear and binary search.

Linear Search

Binary Search

Aliasing Code Trace

At the end of this set of operations, what list value will each variable hold?

```
x = [ "15110", "Fall" ]
z = [ "15110", "Fall" ]
y = x
x.append("CMU")
y = y + [ "Reci" ]
z.append("CMU")
y.pop(0)
```

x = _____

y = _____

z = _____

Are there any aliases at the end of the code?

RECURSIVE CODE TRACING

Consider this recursive function:

```
def f(a, b):  
    if a == []:  
        return []  
    else:  
        return [a[0]] + [b[0]] + f(a[1:], b[1:])
```

If we call the function with these values:

```
print(f([1,2,3], [4,5,6]))
```

Trace through the code to determine what will be printed.

RECURSIVE CODE WRITING

Write the function **isPalindrome** that takes in a string and returns **True** if the string is a palindrome and **False** otherwise. For example:

`isPalindrome("abba")` should return `True`

`isPalindrome("Dancing Queen")` should return `False`

`isPalindrome("123321")` should return `True`

`isPalindrome("")` should return `True`

```
def isPalindrome(s):
```

Write the function **listMultiply** that takes in a list of integers and returns a new list, where each number in the original list (*n*) is repeated *n* times in the new list.

`listMultiply([1,2,3])` should return `[1, 2, 2, 3, 3, 3]`

`listMultiply([6])` should return `[6, 6, 6, 6, 6, 6]`

```
def listMultiply(lst):
```

Write the function **fib** that takes in a number n and returns the n th number in the fibonacci sequence. Recall the definition of the fibonacci sequence

$$f(0) = 0$$

$$f(1) = 1$$

$$f(n) = f(n - 2) + f(n - 1)$$

```
def fib(n):
```